Water Quality Criteria for Copper[8]	
Acute Criteria	**Chronic Criteria**
6.1 ug/L	4.46 ug/L

Table 4.5
Summary of Stormwater Discharge Evaluation for Copper -- Trans-Lake Water Quality Study

Stormwater Alternative	Bridge Alternative	Rainfall/Runoff Scenario	Stormwater Runoff *Average* Conc.[1] Copper (ug/L)	Stormwater Treatment Removal Efficiency[2]	Stormwater Discharge Concentration[3] Copper (ug/L)	Concentrations in Containment Lagoon during Storm Event[4] Concentraton at 25% Storm Flow into Lagoon[5]	Concentration at 50% Storm Flow into Lagoon[5]	Concentration at 100% Storm Flow into Lagoon[5]	Concentration at the Lagoon Interface with Lake (10 ft)[6]	Concentration at Mixing Zone Boundary (100 ft)[7]
I. Pontoons with Catch Basins	4	10% WQ Treatment	22.3	0.47	10.5	0.06	0.08	0.12	0.02	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.30	0.40	0.61	0.12	0.03
		WQ Treatment	22.3	0.47	10.5	0.61	0.81	1.21	0.24	0.06
	6	10% WQ Treatment	22.3	0.47	10.5	0.05	0.07	0.10	0.04	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.25	0.33	0.49	0.20	0.05
		WQ Treatment	22.3	0.47	10.5	0.49	0.66	0.98	0.39	0.10
	8	10% WQ Treatment	22.3	0.47	10.5	0.02	0.03	0.04	0.03	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.10	0.13	0.20	0.16	0.06
		WQ Treatment	22.3	0.47	10.5	0.20	0.27	0.40	0.32	0.13
II. Pontoons with Vault System	4	10% WQ Treatment	22.3	0.47	10.5	0.06	0.08	0.12	0.02	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.30	0.40	0.61	0.12	0.03
		WQ Treatment	22.3	0.47	10.5	0.61	0.81	1.21	0.24	0.06
	6	10% WQ Treatment	22.3	0.47	10.5	0.05	0.07	0.10	0.04	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.25	0.33	0.49	0.20	0.05
		WQ Treatment	22.3	0.47	10.5	0.49	0.66	0.98	0.39	0.10
	8	10% WQ Treatment	22.3	0.47	10.5	0.02	0.03	0.04	0.03	0.01
		50% WQ Treatment	22.3	0.47	10.5	0.10	0.13	0.20	0.16	0.06
		WQ Treatment	22.3	0.47	10.5	0.20	0.27	0.40	0.32	0.13

Notes:

[1] Stormwater runoff concentration based on average event mean concentration (EMC) from Caltrans highway monitoring data collected in 2000-01 (Kayhanian, et al., 2002).

[2] Stormwater treatment removal efficiency represents the low range of Alternative 4's estimated effectiveness, as identified in the AKART analyses (see Table 3.2).

[3] Stormwater discharge concentration is concentration of pollutant remaining after the stormwater treatment removal efficiency is applied to the average stormwater runoff concentration.

[4] Background Lake Washington copper level of 0.99 ug/L (median) was added into the stormwater discharge concentration to represent the mixed final concentration.

[5] Dilutions are calculated to represent stages in the storm event (25, 50 and 100 percent) during which the stormwater discharge mixes with progressively greater volumes of water in the containment lagoon (50, 75, and 100 percent); the calculations assume no escapement of runoff.

[6] Dilution at 10 feet from the bottom edge of the containment lagoon's interface with Lake Washington. Dilution rates at this interface decrease with increasing width of the containment lagoon.

[7] Dilution at the mixing zone boundary (100 feet from the containment lagoon discharge point) results from turbulent mixing and vertical diffusion in the lake. These dilutions are plausible minimum values under dry season lake conditions.

[8] Based on Surface Water Quality Standards for Washington (WAC 173-201A). The freshwater acute criteria is a 1-hour average concentration and chronic criteria is a 4-day average concentration, both are not to be exceeded more than once every three years on the average. Background hardness assumed is 38 mg/L, and this is the minimum observed in the lake.

Abbriveations:

WA - Washington
WQ = water quality
ug/L = micrograms per liter
EPA = Environmental Protection Agency
Conc. = concentration
% = percent
ft = feet
mg/L = milligrams per liter